reservoir catalytic converters. The so-called SCR converters are generated by means of a supply of urea and/or ammonia reducing agent, while the so-called reservoir catalytic converters are regenerated with hydrocarbons of the conveyed internal combustion engine fuel in so-called rich phases of the exhaust gas.

[0001] EP-A-0381236 has disclosed a system, which uses the metered addition of ammonia as a reducing agent to remove nitrogen oxides from exhaust gases of a diesel engine. This system is also provided with a turbocharger, which reduces the pressure of the exhaust gas. A urea/water solution used is metered in by means of compressed air.

[0002] DE-A-44 41 261 has disclosed an apparatus for aftertreating exhaust gases of an internal combustion engine, which is intended to improve the capacity of the catalytic converter by means of a metering device. The metering device is embodied as an extremely low-quantity metering positive-displacement pump, which has a thread in the form of a groove on a cylindrical rotation body, where in order to change the delivery capacity, the rotation body is driven at a variable speed. The addition of the reducing agent into the exhaust gas system preferably takes place in a characteristic field-dependent manner, i.e. as a function of the quantity and/or composition of the exhaust gas.

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[0003] DE 197 50 138 describes a urea metering system with a compressed air supply for atomization, in which a check valve is provided in the compressed air path provided for this.

[0004] DE 42 30 056 A1, for example, has disclosed the production of an aerosol, which is based on a reducing agent and the compressed air acting on it, in a mixing chamber. In this connection, the reducing agent and the air are supplied to the mixing chamber via separate lines.

During a metering operation, pressure fluctuations and turbulence can occur in the mixing chamber, which can cause a reflux of reducing agent, for example an aqueous urea solution, into the compressed air line. For example in motor vehicles, since the compressed air used is taken from an on-board compressed air system, such a reflux of the reducing agent into the compressed air line can lead to a contamination of the entire on-board compressed air system. This can cause damage to a compressed air brake system, for example due to the corrosive action of a urea/water solution.

[0005] The object of the invention is to improve an exhaust gas aftertreatment apparatus of this generic type to such an extent that a contamination of the air supply line or an on-board compressed air system that communicates with it can be reliably prevented through the use of a compact design.

[0006] This object is attained by means of an apparatus with the features of the independent claims.

[0007] The measure according to the invention of supplying means for preventing a reflux of air or a reducing agent/air mixture from the mixing chamber into the compressed air line effectively prevents contamination of the compressed air line and of the on-board compressed air system. It is therefore

possible, for example, to act on the air in the compressed air with a pressure that is relatively low in comparison to conventional designs.

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[0008] The means for preventing a reflux are embodied in the form of a check valve disposed in the mixing chamber. A check valve of this kind, which is integrated into the mixing chamber, makes it possible to embody the apparatus according to the invention in a particularly compact manner, in particular by using a small elastic body such as an elastic tube or an elastomer valve body.

[0009] Advantageous embodiments of the apparatus according to the invention and the mixing chamber according to the invention are the subject of the dependent claims.

[0010] The check valve disposed in the mixing chamber suitably has an elastic tube slid onto the valve body, where the tube is pervious or impervious, depending on the direction in which the pressure is exerted on the valve. A check valve of this kind, whose tube can be comprised of a silicone material, for example, is very small and can be easily replaced.

[0011] According to another preferred embodiment of the apparatus according to the invention, the check valve has an elastomer valve body, which rests with a sealing lip in an airtight manner

against an inner wall of the valve housing or the compressed air line. A check valve of this kind is also very small, inexpensive, and has proven to be rugged and dependable.

[0012] According to a preferred embodiment of the mixing chamber according to the invention, the check valve has an elastic tube, which is slid onto a valve body; when pressure is exerted on it in the compressed air supply direction by means of the compressed air, the tube permits compressed air to pass from the compressed air line into the mixing tank and when pressure is exerted on it in the opposite direction by means of the reducing agent/air mixture in the mixing tank, the tube prevents this mixture from traveling into the compressed air line.

[0013] Preferred embodiments of the apparatus according to the invention and of the mixing chamber according to the invention will now be explained in detail in conjunction with the accompanying drawings.

[0014] Fig. 1 is a block circuit diagram-style view,

[0015] Fig. 2 is a sectional side view of a preferred embodiment of the mixing chamber according to the invention, and

[0016] Fig. 3 shows another preferred embodiment of a check valve that can be used according to the invention, in a side view and a perspective view.

[0017] In Fig. 1, the reference numeral 1 refers to a urea tank from which a urea/water solution is aspirated by a supply pump 4 via a line 1a with a check valve 2 and a filter 3, which is embodied as a filter sieve, and is fed via another check valve 6 to a metering valve 7 of a mixing chamber 8. The metering valve 7 meters the required quantity of urea/water solution into a mixing tank, which is labeled 9 in Fig. 2. A possible overflow quantity of the urea/water solution can be returned through a return line 12 to the urea tank 1 via a pressure regulator 5 and another check valve 11. A possibly necessary ventilation of the line 1a can be executed via a ventilation circuit with a ventilating valve 10.

[0018] In addition, the reference numeral 20 refers to a compressed air tank from which compressed air can be introduced into the mixing chamber by means of a pressure controller 21, a 2/2-way valve 22, and a check valve 23. The provision of the check valve 23, which can be embodied for example as a ball valve or a flat seat valve, can prevent a reflux of a reducing agent/air mixture from the mixing chamber into the compressed air line 24. In comparison to conventional systems, this sharply reduces the danger of a contamination of an on-board compressed air system that communicates with the compressed air line 24. Check valves of

this kind, which can be embodied, for example, as ball valves or flat seat valves, are very inexpensive to procure and use, and have proven to be rugged and dependable.

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[0019] By acting on the urea/water solution with the compressed air, an aerosol is produced in the mixing chamber 8, which is introduced into a catalytic converter 30 via an aerosol line 25.

the air mixes with the aqueous urea solution flowing out of the urea line 1a.

[0020] If a mixture reflux from the mixing tank 9 into the diffuser 18 takes place during non-stationary operation or due to turbulence, then the silicone tube 14 is pressed tightly against the inner wall 16 of the mixing chamber and prevents the further reflux of the mixture into the compressed air line 24.

[0021] Another preferred embodiment of a check valve that can be used in the apparatus according to the invention or the mixing chamber according to the invention will now be described in conjunction with Fig. 3. In this connection, Fig. 3a gives a sectional view and Fig. 3b gives a perspective, exploded view of the check valve. The essential item of the check valve shown in Fig. 3 is an elastomer valve body 34, which rests with a sealing lip 35 in an airtight fashion against the inner wall 36 of a valve housing 46. It is likewise possible for the sealing lip 15 to rest directly against the inner wall of the compressed air line, as has been described in conjunction with Fig. 1. When air flows in from the air line 24, the valve opens; when there is a reflux of air, the valve closes.

For a universal application, the valve is preferably embodied as a valve cartridge 70, which is comprised of the valve body 34, the valve housing 46, and a valve cover 60.

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